# ANSWERS TO END-OF-CHAPTER QUESTIONS

***3,4, 7 AND 8 WERE HOMEWORK QUESTIONS***

**12‑2 (*Key Question*) Complete the following labor demand table for a firm that is hiring labor competitively and selling its product in a competitive market.**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | |  |  | |  | |  | | |
| **Units**  **of**  **labor** | **Total**  **product** | | **Marginal**  **product** | **Product**  **price** | | **Total**  **revenue** | | **Marginal**  **revenue**  **product** | | |
|  |  |  |  |  |  |  |  | |  |  | |
|  |  |  |  |  |  |  |  | |  |  | |
| **0**  **1**  **2**  **3**  **4**  **5**  **6** | **0**  **17**  **31**  **43**  **53**  **60**  **65** |  | **\_\_\_\_**  **\_\_\_\_**  **\_\_\_\_**  **\_\_\_\_**  **\_\_\_\_**  **\_\_\_\_**  **\_\_\_\_** | **$2**  **2**  **2**  **2**  **2**  **2**  **2** |  | **$\_\_\_\_**  **\_\_\_\_**  **\_\_\_\_**  **\_\_\_\_**  **\_\_\_\_**  **\_\_\_\_**  **\_\_\_\_** |  | | **$\_\_\_\_**  **\_\_\_\_**  **\_\_\_\_**  **\_\_\_\_**  **\_\_\_\_**  **\_\_\_\_** |  | |

a. How many workers will the firm hire if the going wage rate is $27.95? $19.95? Explain why the firm will not hire a larger or smaller number of units of labor at each of these wage rates.

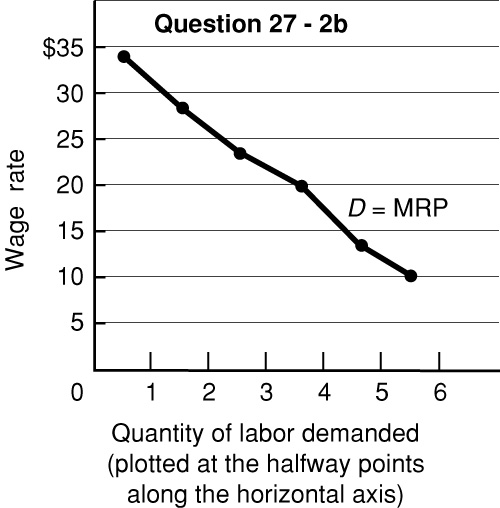
b. Show in schedule form and graphically the labor demand curve of this firm.

c. Now again determine the firm’s demand curve for labor, assuming that it is selling in an imperfectly competitive market and that, although it can sell 17 units at $2.20 per unit, it must lower product price by 5 cents in order to sell the marginal product of each successive labor unit. Compare this demand curve with that derived in question 2b. Which curve is more elastic? Explain.

Marginal product data, top to bottom: 17; 14; 12; 10; 7; 5. Total revenue data, top to bottom: $0, $34; $62; $86; $106; $120; $130. Marginal revenue product data, top to bottom: $34; $28; $24; $20; $14; $10.

(a) Two workers at $27.95 because the MRP of the first worker is $34 and the MRP of the second worker is $28, both exceeding the $27.95 wage. Four workers at $19.95 because workers 1 through 4 have MRPs exceeding the $19.95 wage. The fifth worker’s MRP is only $14 so he or she will not be hired.

1. The demand schedule consists of the first and last columns of the table:



(c) Reconstruct the table. New product price data, top to bottom: $2.20; $2.15; $2.10; $2.05; $2.00; $1.95. New total revenue data, top to bottom: $0; $37.40; $66.65; $90.30; $108.65; $120.00; $126.75. New marginal revenue product data, top to bottom: $37.40; $29.25; $23.65; $18.35; $11.35; $6.75. The new labor demand is less elastic. Here, MRP falls because of diminishing returns *and* because product price declines as output increases. A decrease in the wage rate will produce less of an increase in the quantity of labor demanded, because the output from the added labor will reduce product price and thus MRP.

**12-3 Suppose that marginal product tripled while product price fell by one-half in Table 12.1. What would be the new MRP values in Table 12.1? What would be the net impact on the location of the resource demand curve in Figure 12.1?**

New MRP values (top to bottom): $21, 18, 15, 12, 9, 6, 3.

The resource demand curve would shift up, with the MRP fifty percent greater for each quantity of resource demanded.

**12-4 In 2005 General Motors (GM) announced that is would reduce employment by 30,000 workers. What does this decision reveal about how it viewed its marginal revenue product (MRP) and marginal resource cost (MRC)? Why didn’t GM reduce employment by more than 30,000 workers? By less than 30,000 workers?**

GM’s decision suggests that the MRC of those 30,000 workers was greater than the MRP. GM didn’t reduce employment further because the MRP of the remaining workers exceeds the MRC. Reducing employment by less than 30,000 workers would have left GM with some employees for whom the MRC exceeded the MRP, reducing the company’s profits.

**12‑5 (Key Question) What factors determine the elasticity of resource demand? What effect will each of the following have on the elasticity or location of the demand for resource C, which is being used to produce commodity X? Where there is any uncertainty as to the outcome, specify the causes of the uncertainty.**

**a. An increase in the demand for product X.**

**b. An increase in the price of substitute resource D.**

**c. An increase in the number of resources substitutable for C in producing X.**

**d. A technological improvement in the capital equipment with which resource C is combined.**

**e. A fall in the price of complementary resource E.**

**f. A decline in the elasticity of demand for product X due to a decline in the competitiveness of product market X.**

Elasticity of demand for a resource is determined by: (1) ease of resource substitutability; (2) elasticity of product demand; and (3) ratio of resource costs to total costs.

(a) Increase in the demand for resource C.

(b) Uncertainty relative to the change in demand for resource C; answer depends upon which is larger – the substitution effect or the output effect.

(c) Increase in the elasticity of resource C.

(d) Increase in the demand for resource C.

(e) Increase in the demand for resource C.

(f) Decrease in the elasticity of resource C.

**12-6 (*Key Question*) Suppose the productivity of labor and capital are as shown in the accompanying table. The output of these resources sells in a purely competitive market for $1 per unit. Both capital and labor are hired under purely competitive conditions at $3 and $1, respectively.**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | |  |  | |
| **Units of**  **capital** | **MP of**  **capital** | | **Units of**  **labor** | **MP of**  **labor** | |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| **1**  **2**  **3**  **4**  **5**  **6**  **7**  **8** | **24**  **21**  **18**  **15**  **9**  **6**  **3**  **1** |  | **1**  **2**  **3**  **4**  **5**  **6**  **7**  **8** | **11**  **9**  **8**  **7**  **6**  **4**  **1**  **1/2** |  |
|  |  |  |  |  |  |

a. What is the least‑cost combination of labor and capital to employ in producing 80 units of output? Explain.

b. What is the profit‑maximizing combination of labor and capital the firm should use? Explain. What is the resulting level of output? What is the economic profit? Is this the least costly way of producing the profit-maximizing output?

(a)  The least-cost combination is found by equating the ratios of the marginal products of each input to their prices.

(b) Output is 142 (= 96 from capital + 46 from labor). Economic profit is $114 (= $142 - $28). Yes, least-cost production is part of maximizing profits. The profit-maximizing rule includes the least-cost rule.

**12‑7 (*Key Question*) In each of the following four cases, MRPL and MRPC refer to the marginal revenue products of labor and capital, respectively, and PL and PC refer to their prices. Indicate in each case whether the conditions are consistent with maximum profits for the firm. If not, state which resource(s) should be used in larger amounts and which resource(s) should be used in smaller amounts.**

a. 

b. 

c. 

d. 

(a) Use more of both;

(b) Use less labor and more capital;

(c) Maximum profits obtained;

(d) Use less of both.

**12-8 Florida citrus growers say that the recent crackdown on illegal immigration is increasing the market wage rates necessary to get their oranges picked. Some are turning to $100,000 to $300,000 mechanical harvesters known as “trunk, shake, and catch” pickers, which vigorously shake oranges from trees. If widely adopted, what will be the effect on the demand for human orange pickers? What does that imply about the relative strengths of the substitution and output effects?**

The effect of the adoption of the mechanical pickers will be to decrease the demand for human pickers. If this occurs, the substitution effect will have been greater than the output effect.

CHAPTER 13 NOT REQUIRED HOMEWORK BUT A GREAT EXAMPLE

**13-6 (Key Question) Assume a firm is a monopsonist that can hire its first worker for $6 but must increase the wage rate by $3 to attract each successive worker. Draw the firm’s labor supply and marginal resource cost curves and explain their relationships to one another. On the same graph, plot the labor demand data of question 2 in Chapter 12. What are the equilibrium wage rate and level of employment? What will be the equilibrium wage rate and the level of employment? Why do these differ from your answer to question 4?**

The monopsonist faces the market labor supply curve *S*—it is the only firm hiring this labor. MRC lies above S and rises more rapidly than S because all workers get the higher wage rate that is needed to attract each added worker. Equilibrium wage/rate = $12; equilibrium employment = 3 (where MRP = MRC). The monopsonist can pay a below-competitive wage rate by restricting its employment.

